

The *Xylopia malayana* fruit: significance of its dehiscence

by

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Xylopia malayana Hook. f. & Thoms. of the family Annonaceae, is a small tree, 10–20 m tall, with smooth, pale greyish bark, distributed in Malaysia, Singapore, and Sumatra (Sinclair 1955). In Singapore it can be found scattered in lowland forest around MacRitchie Reservoir and in the Bukit Timah Nature Reserve.

The mature carpels of this tree are oblong obovoid, 3–3.8 cm long, 1.5–1.8 cm across, slightly ridged on the dorsal side and shortly stipitate at the base. They are greyish green to yellowish green in colour, sometimes with a pinkish tinge when fully matured. The surface of the carpels is densely covered with short, velutinous hairs. The mature carpels, usually 2, 3 to many (12 or so) in a bundle (Figure 1a), form an aggregate fruit, or botanically a follicetum.

The mode of dehiscence of these mature carpels is interesting. A dehiscent line at first appears at the median of the dorsal suture, and from there it extends towards both apical and basal ends (Figure 1b). After the carpel has completely

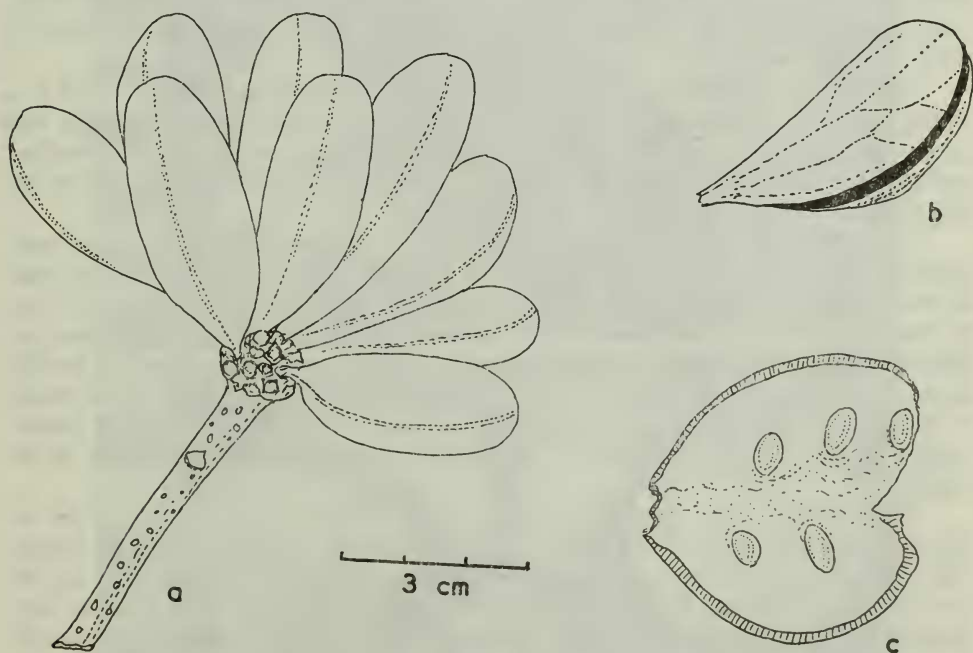


Fig. 1. *Xylopia malayana* Hook. f. & Thoms. a. An aggregate fruit (consisting of 9 free carpels); b. A mature carpel dehiscing along the dorsal suture; c. A dehiscent carpel with seeds arranged in two rows on both sides of the ventral suture.

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dehiscent along its dorsal suture, it exposes the soft, somewhat juicy, pink to scarlet-red pulp in which two rows of seeds were embedded, showing 2 to 4 seeds on each row, alternatively arranged along the ventral suture (Figure 1c). In the freshly exposed fruit, the seeds are coated with a thin layer of creamy white, waxy substance. After the seeds are exposed in the air for a day or two, the colour of the seed coat gradually changes from creamy white to pale chestnut and then to dark chestnut brown. The fruit wall or pericarp is soft leathery in texture. The two wing-like valves of the dehiscent carpels gradually curve acutely backwards, often severely damaging the adjacent tissues near the apex and base of the fruit. Therefore, in an advanced stage of dehiscence, carpels are often found to be further split along the ventral suture to a greater or lesser extent.

The trees which we examined in Singapore and in Southern Johore, Malaysia were fruiting during October and November, 1972. A considerable amount of fruit, partly or fully dehiscent, was found on the ground under the trees, and some of it had been damaged by an unknown animal. Since the open carpels possess a faint, fragrant smell, and display a mass of bright pink to scarlet pulp with several white to brown seeds, it seems probable that the seeds of *Xylopia malayana* are dispersed by birds. (cf. Pijl 1969).

Hutchinson (1959, 1: 134) gives a general description of the fruit of Annonaceae as follows "carpels usually stipitate in fruit, free, rarely united into 1- or many-locular mass, dry or fleshy, rarely dehiscent". Sinclair (1955, p. 168) observed that in the Malayan Annonaceae, "the carpels are indehiscent, except in the case of *Anaxagorea*, where the carpels are follicles. In some species of *Xylopia* and *Alphonsea*, there is a kind of semi-dehiscence but the carpels do not open by well-defined sutures".

Further it is interesting to note as Sinclair pointed out (p. 347) that there is a strong resemblance between *Anaxagorea* and *Xylopia* in their carpels, stamens and geographical distribution. Both genera, together with several others are classified under the tribe Xylopieae by Sinclair, but reduced to the *Xylopia* Group of the tribe Unoneae by Fries (1959).

It is generally accepted that the follicular fruit probably represents the basic pattern of fruit among angiosperms (Eames 1961, Takhtajan 1969). Most members of the modern Magnoliaceae have follicular fruits. The fruit of the ancestral form of the Annonaceae is very likely of a similar nature. Therefore the presence of follicular carpels in *Anaxagorea* (which contains only one or two nearly basally attached ovules and seeds in each carpel) and *Xylopia* (which has a special mode of dehiscent as described above) probably indicate that each of these two genera retains in part the characteristics of the fruit of the putative ancestral form of the family.

It should also be pointed out that the main dehiscent line of the carpels in *Xylopia*, like that of many members of the Magnoliaceae, is along the dorsal suture. This is in contrast to the definition of a follicle as given in most glossaries and to the follicular fruits as found in *Anaxagorea* and in various other families (e.g. Illiciaceae, Dilleniaceae, etc.) in which the dehiscent line is invariably along the ventral suture.

Monographers of the Annonaceae generally agree that the flower structures of *Anaxagorea*, *Xylopia*, and allied genera which constitute the tribe Xylopieae, are all characterized by the valvate sepals and petals, and are thus considered to be of fairly advanced nature. The retention of the more primitive characters of the fruit in these genera may be explained by postulating a discrepancy in evolutionary rate between the flowers and the fruits.

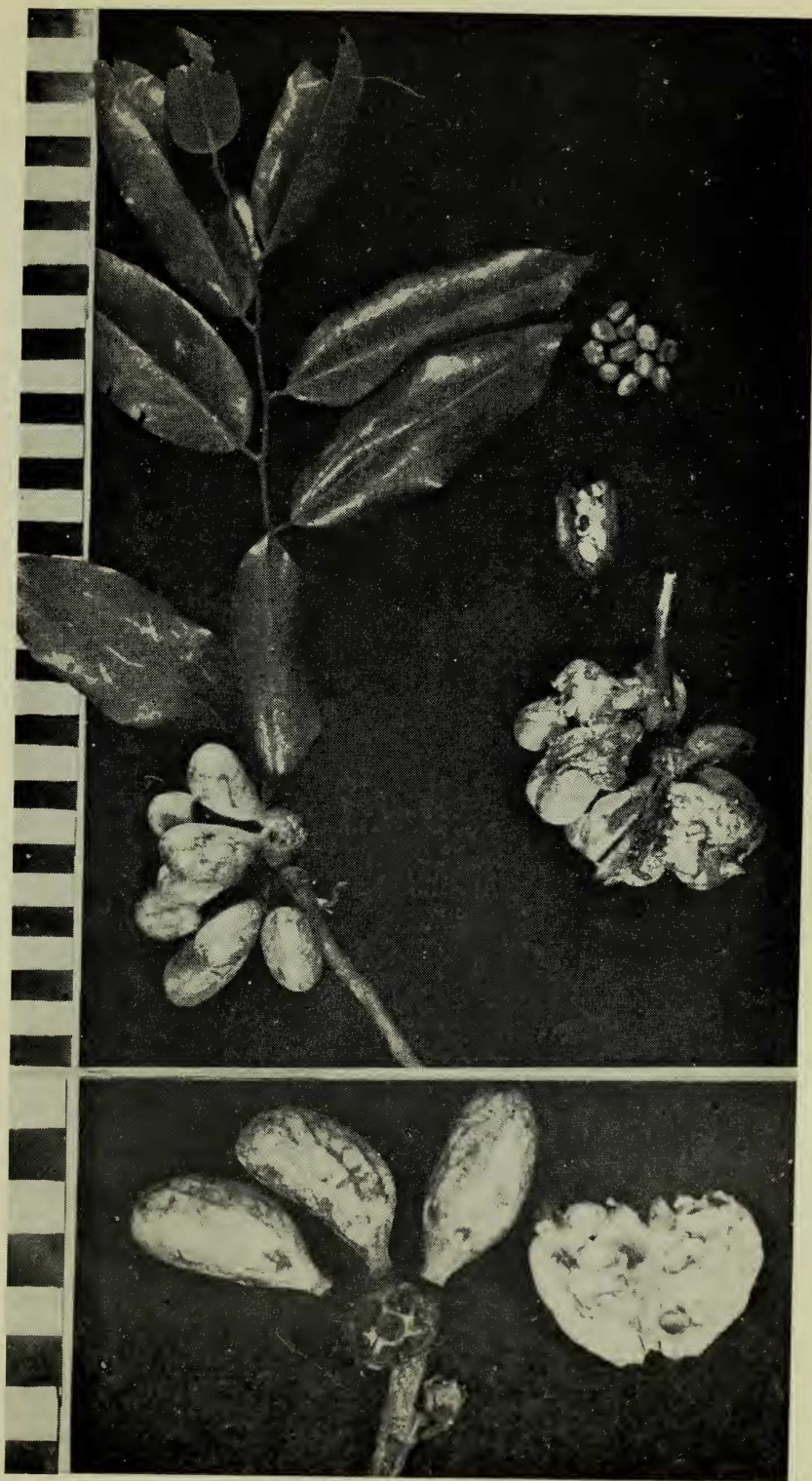


Plate 1. *Xylopia malayana* Hook. f. & Thoms.

Above: a fruiting branch with dehiscent carpels and seeds;

Below: an aggregate fruit and a dehiscent carpel.

(scale: 1 cm divisions)

Photo by Mr. D. Teow